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ELECTRONIC DELIVERY

California Energy Commission
Docket Office
Attn: Docket No. 06-IEP-1K
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

Re: Docket No. 06-IEP-1K – 2007 IEPR D COST OF GENERATION

Docket Office:

Please find attached PG&E's comments on the workshop held June 12, 2007, regarding "**Cost of Electricity Generation**".

Please contact me should you have any questions. I can be reached at 415/973-6463.

Sincerely,

Les Guliasi

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Attachment

Pacific Gas & Electric Company

Comments on CEC's Comparative Costs of California Central Station Electricity Generation Technologies

Docket number No. 06-IEP-1K

Pacific Gas and Electric Company (PG&E) appreciates the opportunity to provide comments on the staff Draft Report, "Comparative Costs of California Central Station Electricity Generation Technologies," presented at the June 12, 2007, Integrated Energy Policy Report (IEPR) workshop. PG&E commends the CEC's comprehensive work on the cost of generation technologies, and appreciated the opportunity afforded by staff to discuss their analysis after the workshop to further our understanding of the assumptions used.

The draft report is instructive and openly addresses the Cost of Generation (COG) model's capabilities as well as limitations and the potential misuse of levelized cost results. PG&E observes that there are a few technologies that appear to be outside the typical range of costs and therefore should be further reviewed by the CEC prior to issuing the final report. Of greatest concern is that the $/kW installed cost of a simple cycle combustion turbine is higher than a combined cycle unit which is more complex and should cost more. This result potentially could be misleading for evaluating financial feasibility or for comparing costs of technologies.

PG&E's scope of comments provided here is limited due to the many details of the report as well as not having access to the supporting data.

Issues that Deserve Further Review and Analysis

- **Anaerobic Digesters**: The Navigant report shows dairy and food digesters similarly priced, but the staff report shows an almost 3-to-1 difference in Tables 2 and 24 while Navigant costs are used in Table 23. Table 24 shows a 94% tax credit without derivation, which can explain some of the difference, but this result is inconsistent with Figure 15.

- **Biomass Costs**: Costs shown in Table 10 for biomass are extremely low and not differentiated between "free" fuel, such as landfill gas, and more expensive fuel, such as wood waste.

- **Combined Cycle and Combustion Turbine**: Combined Cycle costs compared to combustion turbine costs changed from 30% higher in the 2003 IEPR to 15% lower in the 2007 IEPR. In addition, the installed costs of a simple cycle unit almost doubled (see table below). It is unclear why the combined cycle costs are not increased proportionately.

	2003 IEPR	2007 IEPR	
Instant Cost	($/kW)	($/kW)	% Increase
Combined Cycle Base Load	$ 620	$ 784	126%
Simple Cycle	$ 477	$ 925	194%

These counter-intuitive results need to be reviewed. Possible reasons could be that many of the combustion turbines were developed under emergency siting or small power plant exemption (SPPE) cases, which potentially reflects a market premium.

Regarding escalation rates, PG&E does not have access to escalation rates used in the analysis, but suggests that capital costs be escalated with a construction cost escalation index, as construction materials costs have recently increased significantly faster than inflation.

  - ✓ **Advance Simple Cycle Technology:** The advanced simple cycle heat-rate improvement to 7580 BTU/kWh is too optimistic (p. 33) compared to the referenced Energy Information Administration (EIA) heat rate of 8550 BTU/kWh (p. 43). If this 7580 BTU/kWh low heat rate were achieved, the expected capacity factor should be higher than 5%. In addition, the CEC's Instant cost of $756/kW for this new technology appears too low. For comparison, the CEC's forecasted cost of a simple cycle unit is $925/kW and PG&E believes the cost of an advanced simple cycle unit will likely be higher.
  - ✓ **Capacity Factors:** Use of historical capacity factors during the 2001-2006 post energy crises may not be a good estimate for future operation.
  - ✓ **Base Combined Cycle Configuration**: Consistent with the 2003 IEPR, the base case configuration should include costs of dry cooling.
  - ✓ **Chillers:** The effects of chillers on heat rate, capacity degradation and parasitic load should be considered.

Also, PG&E recommends that variable costs be excluded in the $/kW-yr columns of Table 2: Summary of Levelized Costs, which presents calculated levelized costs that appear to include both fixed and variable costs.

- **Solar Dish Engine:** The cost is more than 50% higher than solar trough, which is inconsistent with SCE and SDG&E contracts under the MPR.

- **Geothermal**: Binary and dual flash technologies appear to be too similarly priced compared to current market prices.

- **Solid Oxide Fuel Cell**: Capital costs appear low, although variable costs for service contract and stack replacement may make up for it.

- **Wave:** Capital costs are on the high side and capacity factor appear too low.

- **Integrated Gasification Combined Cycle (IGCC):** Costs for this technology should include CO_2 sequestration costs to account for further reductions in greenhouse gas emissions.

- **Advanced Nuclear:** Capital costs appear low.